

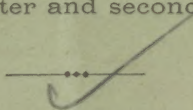
Faget (J. C.)

TYPE AND SPECIFIC CHARACTER

—OF—

TRUE YELLOW FEVER,

As shown by Observations taken with the assistance
of the Thermometer and second-hand Watch.



By J. C. FAGET, M. D.,

Member of the "Société Médicale d'Observation."



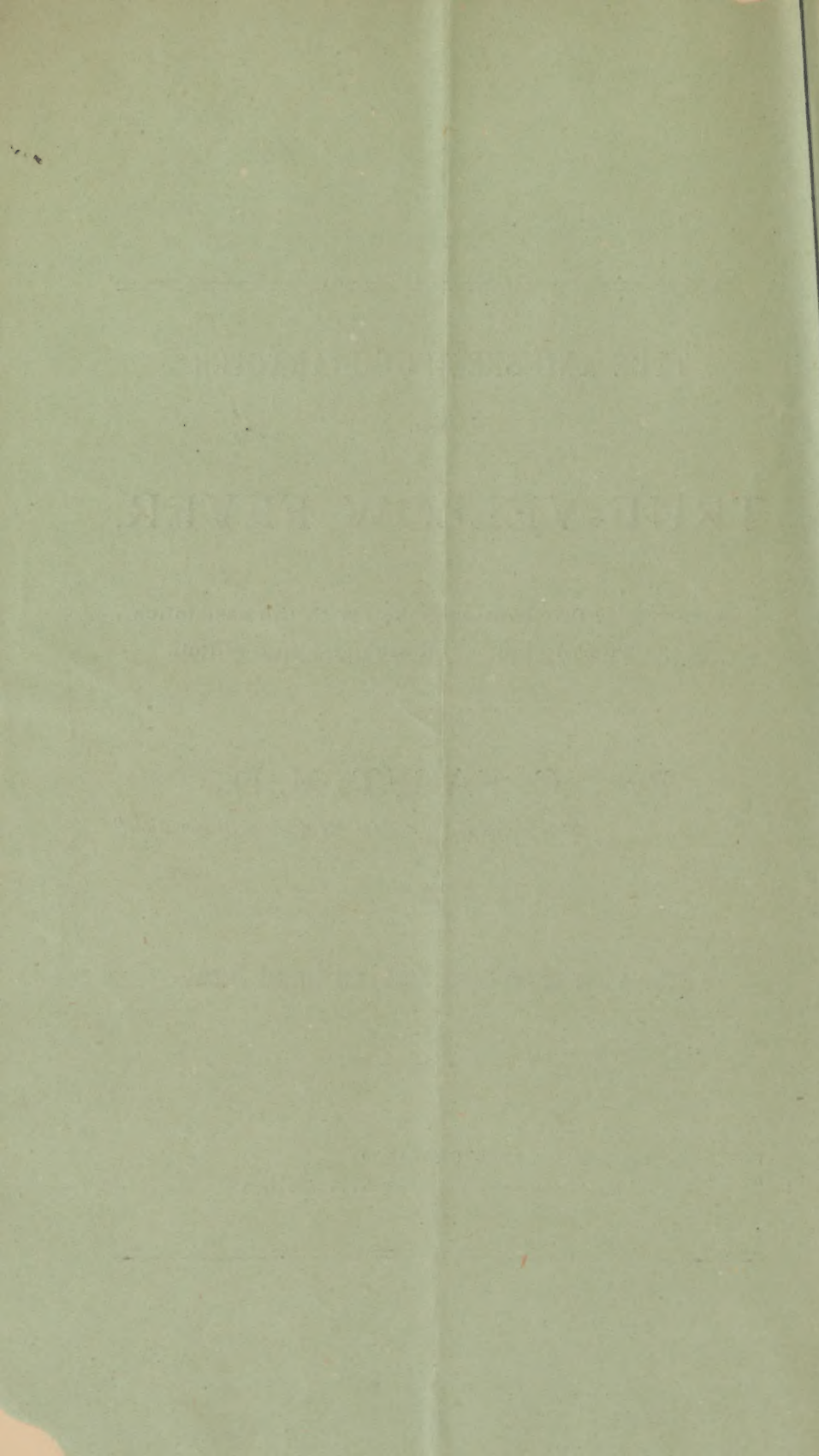
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honorary
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ORIGINAL COMMUNICATIONS.

ARTICLE I. *Type and Specific Character of true Yellow Fever, as shown by Observations taken with the assistance of the Thermometer and second-hand Watch.* By J. C. FAGET, M. D., member of the "Société Médicale d'Observation."

"Nil sub sole novum."—SALOMON.

I.

PRELIMINARY REMARKS.

"Though the subject of tropical fevers is too little known to warrant decided opinions on many points, yet the true yellow fever, or hæmagastrie pestilence, is now so clearly stamped with characters so peculiarly its own, that it takes its place as a *specific* fever of a *continuous* * * * type."—Aitken, 439, vol. 1.

The main object of this article is to prove that true yellow fever is a fever of a *continuous* type, and that it takes its place as a *specific* fever, distinct from all other fevers, and is especially to be distinguished from the *malarial* species. These two points have been settled, beyond any doubt, by the above-named English author; but it will prove beneficial, in our opinion, to strengthen his arguments with the more recent data furnished by investigations with the thermometer and independent second-hand watch.

It follows that our object is to investigate, with the thermometer and time piece, the following questions: 1st. Is true yellow

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fever, a fever of a *continuous* type? 2d. Is it to be pronounced a *specific* fever, *i. e.*, a fever originating from a *special* poison,—a *specific* morbid principle to be compared with that of variola, cholera, or of any other well defined *morbid species*.

We are living on the very ground where the first question may be solved, the city of New Orleans being, though a large city, a real type of a swampy location; and, regardless of a few respectable disputants, all sorts of swamp fevers combine themselves with other diseases in our unfortunate city, so that *paroxysms* are obtained through malarial influence.

"The study of the habitual toxic effects of, and remedies for swamp poison, is the life long task of the physician practising in the Southern or Western States of the Union. No other morbid cause is so *omnipresent*, so constantly operative, either singly or combining itself with other blood poisons."—Prof. Bemiss, *N. O. Med. and Surg. Journal*, July, 1873, p. 27.

It is plain that, in the event that all our cases of yellow fever prove to be cases of *continuous* fever, when observed in such conditions as we have described, yellow fever observed on any other ground shall always prove to be a fever of a *continuous* type.

In the processes of all fevers we have mainly to consider two elements: 1st, the increase of the temperature of the blood; 2d, the increase of the beatings of the heart, per minute. The thermometer and watch will furnish exact data concerning these two points.

Professor Wunderlich certainly went too far, when he wrote, in the Introduction to his Treatise on Medical Thermometry, that "the variations of temperature, in diseases, coincide with other functional disturbances, but none of these can be determined upon and measured so accurately as the temperature." We know very well that in the course of a fever, the second-hand watch gives as precise and accurate information of the condition of the pulse as the thermometer furnishes concerning the temperature.

Dr. Hirtz, a professor in Strasburg, followed the steps of the German professor, and went so far as to say that "the condition of the pulse, considered so far, as the most important sign of fever, does not by itself furnish any valuable information." (Page 748, vol. xiv. of the New French Dictionary of Medicine and Surgery, 1871.)

We shall see, on the contrary, that in yellow fever, the charac-

ter of the pulse is more interesting to the physician than the study of the temperature.

The two factors of the fever having been measured and counted twice daily with the thermometer and watch, and the exact numbers accurately recorded, these numbers may be very advantageously figured by *lines*, for it is easier to follow a line on the paper than to calculate numbers; the meaning of the figure is more easily understood. We shall make use of *tableaux of lines* in order to follow the description of the process of the fever, in the history of 38 cases which we have gathered from the epidemic of 1870, through the kind assistance of several confreres.

It does not suffice, however, when studying a fever, to make use of instruments even with the greatest possible care, so as to obtain the most precise results; *before all*, we must be satisfied, beyond any doubt, that we have to deal with *that particular fever*, and no other. Epidemics are not always simple; in my opinion, the four or five great epidemics of yellow fever in New Orleans, from 1853 to 1873, were complicated with *malarial hæmatemesic fevers*; hence all our difficulties. I think we have some means of getting rid of them.

In the very beginning of our yellow fever epidemics, *separate groups* of patients may be observed, especially on the Levee, and in the neighborhood of our port, where *foreigners, new-comers*, are to be found in large numbers. The first cases to be observed at the Charity Hospital, French Asylum, &c., are usually furnished from these sources, where we have observed the disease, and where it can be thoroughly studied. In such groups a number of poor immigrants are to be found, who have landed a day or two previous, from the same ship; suddenly taken with violent fever, with supra-orbital pain and rachialgia, such symptoms being always present in the first stage of yellow fever. These patients very soon offer the "*general assemblage and collection of symptoms*" (Aitken, p. 439) which are considered by all physicians as the characteristic signs—the pathognomonic collective signs of yellow fever. To exhibit the condition of the pulse and temperature in such patients, in similar circumstances, is certainly exhibiting them in patients laboring under yellow fever. In the aggregate number of patients, some few cases will undoubtedly be diagnosed as yellow fever cases, through some mistake; but the great majority of cases observed will certainly belong to the genuine species; so that we may have all confidence in the average num-

ber of observations. Let us review, according to such data, the epidemic of 1870.

II.

ANALYTICAL STUDY OF THE LINES INDICATING THE TEMPERATURE AND PULSE, AS SHOWN BY THE 38 CASES OBSERVED DURING THE EPIDEMIC OF 1870.

The yellow fever epidemic of the year 1870 in New Orleans, a small epidemic if compared with many others, began in the month of August, in the neighborhood of the port, as usual, and in that instance in the French part of the city. The disease only spread within a very short radius from around its starting point; it reached its utmost intensity in September, and came to an end in November. Our 38 tableaux of lines are distributed as follows: 34 in September, 3 in October, and 1 in November.

During that lapse of time, the meteorological condition, and the local changes in our city did not present anything unusual: Average temperature 80 to 90, F., atmosphere usually very damp and calm. The warmest days have been chosen, as usual, as the time when the streets should be dug, and railway tracks laid down for street cars; filthy and stagnant waters everywhere, containing animal and vegetable matters, &c.,

Our observations have been taken in the very epidemic centres, or from patients living there when taken ill; all such persons had recently landed in the city, coming from different parts of Europe, and were mostly French and Italians. The diagnosis of the disease can hardly be questioned in such cases, especially when confirmed by the process of the disease, the general contour of the symptoms and their successive evolution.

Of course, throughout the yellow fever epidemic, especially in the month of September, the *malarial hemorrhagic* fevers, even of the *hamatemesic* variety have been observed; we have not to speak of such fevers in the present article.

Our 38 tableaux of cases have been furnished as follows: 7 by Prof. Bemiss, all from the Charity Hospital, thermometer in axilla; 16 by Dr. Touatre, physician to the French Asylum, some from the asylum, the rest from the city; 3 by Dr. Layton, and 12 by myself; these last 15, from the very focus of the epidemic. Doctors Layton, Touatre and myself took the temperature in the

patient's mouth, placing the thermometer between the gums and cheek.

On examining all our tableaux collectively, the striking feature is that they all show a graphic indication of a fever of the *continuous* type, hardly any exception being observed; the fever shows only *one* paroxysm, rapidly obtaining its highest point, to decline immediately, and then slowly returning to the normal standard, having had no stationary stage.

In the majority of our tableaux, the lines of temperature show a slight increase in the evening and a decrease in the morning. Every one knows that such is also the case with all fevers, even of the most continuous type. These slight exacerbations are not even shown, in most cases, by the lines of the pulse, especially in the *first days* (obs. No. 14), when the poison is the only active agent of the fever, the *secondary visceral congestions* not having as yet appeared.

In a few of our tableaux (Nos. 2, 4, 8, 10, 12, 21 and 30) the lines seem to show some indication of a stationary stage after the third day, and up to the sixth or seventh day; towards the third or fourth day, the two lines remain parallel with each other and run horizontally, showing irregular parts corresponding to the evening exacerbations. Nos. 2, 4, 10, 12 are such cases, and have proved fatal; the *horizontal irregular* lines which, in the middle of their course, seem to indicate a stationary stage, are in reality the mark of that process of *capillary congestion of the viscera* which brings on the fatal results. Obs. 8 and 21 show evidences of the same congestive process, but here the congestion is external; it resulted in a phlegmon of the elbow (No. 8), and a suppurative inflammation of the parotid gland in observation No. 21.

Thus are seen to vanish these false appearances of a stationary stage. Moreover, the so-called stationary stage would show itself after the decrease of the fever, and not, as in all fevers, after the increase; for in our tableaux it only appears after the decreasing lines of the first stage.

None of our tableaux support the assertion written in the article "Fevers" of the New French Dictionary of Medicine (1871) e. g. "In some fevers the remission is long and complete, as in yellow fever, for instance, in which the *initial attack* is separated from the *terminal fever* by a *remission* of one or several days duration" (p. 742, vol. xiv).

According to our tableaux, yellow fever shows *one single effervescence*—only *one paroxysm*, never a true remission and the *unique attack* subsides immediately. Its progress is regressive, as soon as it appears. This last peculiar feature would not show as plainly in our tableaux, but for the fact that they often begin after the 2d and even 3d day. The fact is that the decline is marked from the very beginning, in the line of the pulse only; as for the temperature we shall see that it even increases, at least in two thirds of the cases, during the first two or three days. In my article "*Hæmatemesic Paludal Fever*," July, 1870, *N. O. Journal*, I only took into consideration the indications furnished by the pulse when I wrote, p. 441: "yellow fever is a fever of only one paroxysm; the march of this paroxysm is the decreasing continued." I had, however, already taken the temperature in some cases of yellow fever, during the epidemic of 1867, and I had been led by these first few observations to believe that the march of the temperature followed that of the pulse; thus, a few pages further, in the same article, I wrote down: "This continuous decrease of the pulse was generally in exact ratio with the temperature of the patient, given by the thermometer in the axilla. But, on this point, my observations are insufficient in number" (p. 445). It will be seen that my reserve, concerning that point, has been fully justified by the subsequent observations made in 1870.

The 38 observations of 1870 also contradict the opinion concerning the *short duration* of yellow fever. According to La-Roche's opinion, based on immense learning, it would be 3 days ($3 \times 24 = 72$): "A febrile stage of about seventy hours' duration, more or less, is succeeded by a period of complete cessation of fever" (p. 426, vol. i). Judging from our tableaux, it should be 6 or 7 days ($6 \times 24 = 144$ hours). As a matter of course, in order to properly understand the meaning of our tableaux, we must take into consideration several attendant circumstances which have a real influence: 1st, malarial and other complications, all of which are possible, and even frequently occurring from the beginning; 2d, the effects of drugs and of diverse medications; 3d, also the effects of the organic congestions occurring inevitably sooner or later in the course of serious fevers. For instance, the duration of the fever has often been changed by the *veratrum viride*, as shown by the tableaux (Nos. 18, 24, 25). On the contrary, *urticaria* in case No. 6, and a phlegmon of the elbow, No. 8,

have stopped the decreasing pulse and temperature, and caused an *increase* in their march, &c., &c. We cannot afford to enter into all details. However, considering that the study of the temperature in yellow fever is very nearly a new subject, we think it best to insist upon these points.

III.

TEMPERATURE IN YELLOW FEVER—HISTORY.

1st. The first positive mention made of temperature in yellow fever may be found in Blair's work. (*Some Account of the Last Yellow Fever Epidemic of British Guiana—1852*); it reads as follows: "From the observations which were made, *with the thermometer*, on temperature of men laboring under yellow fever in Barbadoes, during the last epidemic, it did not appear to be high—when highest, not exceeding 104° F. in axilla." This extract is from a note of John Davy, end of page 78. The use of the thermometer, as a means of investigating cases of yellow fever, would seem to have been first tested by John Davy, more than twenty years ago.

2d. In Griesinger's *Treatise on Infectious Diseases*, (1868), we read, at page 113, "that, so far, observations on yellow fever have not been taken with the assistance of the thermometer. Lyons, however, has sometimes quoted an increase of temperature up to 104° F. on the second day of the disease. An *increase* in the temperature has also been observed *before death*, such as may also be observed in our typhus fever."

3d. In Wunderlich's great "*Treatise on the Temperature in Diseases*," 1871, we read, page 405, that: "The course of the temperature in yellow fever has been made known to us through an interesting paper of Schmidlein's, in the *Deutsches Archiv. für Klinisch Med.* iv., 50. According to him, the temperature is highest in the first few days of this disease, and very often reaches a height from 104° F. to 105° F., very frequently with slight evening exacerbations. From the *fourth* to the *fifth* day, the temperature steadily falls and sinks down to normal, or even below this. In cases which end fatally, it *rises* again towards the end some 3° to 6° F., or even more."

We have not been able to find anything more about the history of temperature in yellow fever. Concerning the first point, "the

maximum of temperature in the very beginning stage being 104° to 105° F.," every writer agrees.

The second point, "the decrease of temperature from the fourth and fifth day," has not been confirmed in New Orleans in 1870; for the temperature has been seen to decrease from the first day in about one third of the cases, and in the other two-thirds from the second day, or for the latest, the third day; in two or three instances only, among our 38 cases, the decrease showed itself after the third day.

"An increase of three or four degrees, F., in the temperature, at the *termination* of the disease, in *fatal* cases," has never occurred in New Orleans: 13 fatal cases, in our tableaux, show an *increase of temperature in the end* in 3 cases only (the temperature had been noted twelve times on the last day), (obs. Nos. 4, 10, 32), and the increase was only of a few tenths of a degree; on the other hand, the temperature has been on the *decrease at the end* of the disease in 9 cases in 12 (Nos. 2, 7, 11, 12, 15, 16, 27, 33 and 38), and in all such cases it has *decreased several degrees*.

Maxima.—Our 38 tableaux show the following *maxima*:

103° F. and a fraction, 10 cases—3 on 1st day, 3 on 2d, 2 on 3d and 2 on 4th;

104° F. and upwards, 21 cases—8 on 1st day, 5 on 2d, 8 on 3d;

105° F. and upwards, 7 cases—1 on 1st day, 1 on 2d, 4 on 3d, and 1 on 4th.

38.	12	9	14	3=38
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In consequence, the *maximum* of temperature in yellow fever, in New Orleans in 1870, has been, in the average of cases, 104° F. Such is the *average maximum* of fevers in general; there is, therefore, in this, nothing peculiar in yellow fever. The particular and special feature is, that: 1st, this average maximum of temperature is *very rapidly* reached in yellow fever cases. In about one-third of our cases (12 in 38) the maximum has been reached on the very first day; in one-fourth of the cases (9 in 38) it was on the second day; in another third of cases (14 in 38) on the third day; and in three cases the disease had gone over three days before reaching the maximum of temperature. 2d: *The maximum holds only for a short time*: in all our cases the temperature began declining *immediately* after reaching its maximum, and it went on *steadily decreasing* till it reached the normal standard, and even *below* that point, except in cases where special circumstances or accidental causes easily accounted for, such as secondary congestions, appeared. Thus we can say that there exists no *stationary stage* in yellow fever.

The decrease of the temperature has been remarkably slow. Up to the fifth day it had not yet reached the normal standard in most of our cases. The exceptions were such as were very mild, or such as proved rapidly fatal. In 20 or 30 the thermometer registered 100 or 102° F. on the fifth day. Tableau No. 3, very carefully taken down by Dr. Layton, is very remarkable concerning the slow progress in the decrease of the temperature: during the second week 100° F. is the average temperature the whole while. On the fifth day it was 103°, and the pulse had then returned to the normal condition; on the seventh day the temperature was normal, but on the tenth day the temperature increased to upwards of 100°, whilst the pulse, always decreasing, only gave on that day 42 beats per minute. The decrease of the pulse had called for the use of stimulants; the effect of these account for the temperature steadily marking 100° F. during the whole of the second week in full convalescence. The stimulants had also very soon aroused the circulation. In short, the march of the temperature in our tableaux is marked, 1st, by a *period of increase, very rapid and of very short duration*; and, 2d, by a *period of decrease, rather slow and long*. There is no sign of a true stationary stage.

Thus the study of temperature in yellow fever offers for our consideration only an *effervescence* and a *deservescence*.

Effervescence.—It has been such that, in a few hours after the sudden appearance of the fever, the thermometer gave 4° F. as an average, and 6° and sometimes even 8° above the normal standard (obs. No. 16). Having practised for more than twenty-five years in New Orleans, I have never met any other form of yellow fever but the *reactive* or *sthenic* form. What shall we say of its "*algidus*" form? This form, "so well described by Dr. Lyons in the Lisbon Epidemic of 1857," according to Aitken's quotation, p. 438, has not gone through a thorough scientific test, that should prove its existence beyond any doubt.

In New Orleans, the effervescence of yellow fever, very active at the onset of the disease, has only held out for three days; in some cases it went on the decrease on the very first day: obs. No. 13 shows, on the evening of the first day, a decrease of more than one degree as compared with the morning temperature of the same day. In some tableaux, we notice from the first to the second day a decrease of three or four degrees, even when the

veratrum has not been used: obs. No. 23 shows a decrease of more than five degrees.

When the effervescent period has lasted two or three days, it has nearly reached the maximum of its increase as early as the evening of the first day; from the first to the second day, the increase was only a few tenths of a degree, and from the second to the third day it was even less (obs. No. 2, 3, 4, 10, 12, 14, 28, 30, 31). Then the defervescence begins, *abruptly*, and is marked in the tableaux by an *oblique y descending* line, forming with the line of effervescence a characteristic acute angle.

Defervescence.—The remarkable feature of defervescence in yellow fever in 1870 was its slow progress: the *average maximum* being 104° F., the line went gradually decreasing for four to seven days before regaining the normal point—98° 5' F.—or one degree per 24 hours.

This simple fact shows that the *defervescence* in yellow fever is not to be taken as a *critical change* or a *crisis*. In those fevers in which the defervescence has to be looked upon as a crisis, it shows itself quite late, and terminates rapidly, say in 36 or 48 hours! For instance, in cases of pneumonia, *when the febrile cycle is regular*; also in the incipient febrile stage of variola, and in varioloid cases, &c, defervescence is notably *shorter* than effervescence; in other words, *the decrease of temperature is more marked than its increase*. The contrary obtains in yellow fever. Effervescence has lasted from one to three days; defervescence from four to seven days. This shows that, in cases of yellow fever, the *average* total duration of the febrile temperature measures *ten days*; whilst, as concerns the *incipient fever of variola* (which bears so much resemblance to the incipient stage of yellow fever) the *ascent*, or *effervescence*, is of four days duration, and the *defervescence*, two days. In Wunderlich's tableaux, *mild cases of scarlet fever* only show a *defervescence* somewhat similar to that of yellow fever.

Minima.—In the decreasing stage, the *minimum* of temperature has several times been found to be *below* the normal point. Unfortunately, we have not been able to keep up with the observations of our cases, after the patients were considered *cured*, *all traces of fever having disappeared*, which condition occurs at a very early stage. Our tableaux are thus made incomplete. Obs. No. 31 shows that on the 8th and 9th days the temperature was

96° 8' and 95° 2' on the 10th day; the patient was fully convalescent. Our tableaux show two other instances of recovery with a *minimum below* the normal point; obs. No 21—10th day, temperature=96° 5' F.; obs. No 17: 6th day 97° 8' F.

In fatal cases, the line of defervescence, checked in its descending progress by the visceral congestions, will sometimes resume an ascending march towards the end, and maintain it until death; but, such is not always the case, contrary to what Dr. Schmidtlien affirms, as quoted from Wunderlich: "In cases which end fatally, it rises again towards the end some 4° F., or even more." This *final ascent*, which we consider as exceptional, has only marked a few *tenths of a degree* in our observations.

In the cases observed in New Orleans the temperature sometimes *went on decreasing during articulo mortis*, and has even reached *below* the normal point at the very moment of death. Obs. No. 16: temperature=97° 7' F. at the moment of death on the 5th day, whilst on the 3d day it marked 104° F. This was a falling of more than 6° F. in 36 hours! Our tableaux read as follows: In 13 fatal cases, the temperature has been noted 12 times on the day of death. The 12 cases show an *ascending* temperature only in three cases, and in these three instances the increase was only a few *tenths of a degree* (obs. Nos. 4, 10 and 32). On the contrary, nine times in twelve the temperature was *descending*, and the decrease in each case was 2, 4, 6, degrees F., and even more (obs. Nos. 2, 7, 11, 12, 15, 16, 27, 33, 38).

I shall sum up in saying that, the march of the temperature in yellow fever, as shown by the graphic lines representing it, is characterized by a *unique paroxysm* with an *efferescence* of one to three days, followed by a *defervescence* of four to seven days, without any stationary stage.

IV.

MARCH OF THE PULSE IN OUR TABLEAUX.

See the tabular records of pulse in the cases mentioned.

The inferior lines which, in our 38 linear tableaux, are intended to point out the march of the pulse, are rendered remarkable by the uniformity and, I should say, the originality of their first direction: twenty cases, carefully noted from the first day, show the line to be *obliquely descending from the very beginning*, with the exception of one or two cases; these observations prove the *pulse to decrease, in the first hours*, in one of the most acute and severest of fevers

known. But the descent of the pulse only begins after a very high ascent has been obtained—120, as an average, which is nearly twice the normal number. This proves that the increase reaches its *maximum* before the first visit of the physician. The pulse slowly decreases, descending still more slowly as the disease goes on, until it reaches the normal point, or even falls below it. The *average maximum* being 120 on the first day, it gives 10 to 15 minus on the second day; 24 hours later it will again show 10 less; then it goes on decreasing the following days, but less rapidly. As a rule, on the fourth day the pulse is about 80, which is only half way in the decrease, and reaches the normal point on the seventh or eighth day; then again it goes on decreasing, till it only beats 40 in some cases! (obs. Nos. 3 and 31.)

Considering the condition of the pulse only, we can find no *augmenting* stage and no *stationary* stage. It shows a *decreasing* fever, which decreases after a very great *ascent*, the *increase* being so rapid, and of so short duration, that the physician is too late to observe it. Obs. No. 9 is a good specimen of the *steady decrease* of the pulse, especially in the first days, after the *sudden ascent* of the incipient stage. In the night of the 3rd to the 4th day, indigestion caused the temperature to increase more than 3° F., and during this *increase of temperature*, the pulse *decreased* 10 pulsations. Therefore it is not surprising that the lines of the pulse do not show the slight exacerbations of the evening, as the lines of temperature show in yellow fever and in nearly all fevers.

Now, after the first days, the *primary* action of the morbid principle being followed or complicated, in many cases, by those congestions of organs which cause changes in the lines of temperature, we are liable to see the same changes occurring in the lines of the pulse through the influence of the same causes (obs. 2, 4, 8, 10, 12, 21, 30).

The march of the pulse is not the same in all cases at the end of the paroxysm of yellow fever. First; in favorable cases, we have seen the pulse continually decreasing, so as to mark, in some instances, as low as 20 *below the normal point*. Second; in more severe cases, its decrease being checked by some congestion, it would again resume its downward march as soon as the congestion would subside. Third, in fatal cases the pulse has an *ascending march*. It steadily ascends, even until it reaches above the incipient maximum point, and may become too rapid to count (obs. No. 12).

This increase of the pulse in the last stage of the disease, in cases where it has proved fatal, may possibly account for the notion of a *terminal fever*, separated from the *initial fever* by a *stage of remission*. But this *terminal increase* usually coincides with a *decrease in the temperature*; as the pulse is going on rising, the patient is getting cold; it is the contrary that characterizes fever.

V.

PARALLEL BETWEEN THE MARCH OF THE TEMPERATURE AND THAT OF THE PULSE.

It is especially in the *incipient stage* of the one paroxysm of yellow fever, that it is particularly interesting, as far as concerns the *diagnosis*, to have a correct notion of the direction of the lines of temperature and pulse. Only 31 of our 38 tableaux have been marked from the first day, and they give the following results:

1st. In about two-thirds of the cases (21 in 31), whilst the line of the pulse invariably descends from the beginning, the line of temperature, on the contrary, ascends during *one day* (obs. Nos. 15 and 22) during *two days* (obs. Nos. 2, 4, 6, 9, 10, 17, 20, 28), and even during *three days* (obs. Nos. 1, 3, 5, 11, 12, 14, 24, 26, 27, 30, 31).

2d. In the other third of our cases (10 in 31—obs. Nos. 7, 8, 13, 16, 18, 19, 21, 23, 25, 29), the two lines decrease parallel with each other, and decrease immediately from the very first day; but, it is fair to observe that, in five cases among these last ten, (obs. Nos. 8, 13, 19, 23, 29), we had to deal with such mild forms that the immediate descent of temperature is easily accounted for; in three cases (obs. Nos. 18, 21, 25) the use of *veratrum* is responsible for the premature decrease of the fever. In two cases (obs. Nos. 7 and 16), the advanced age of the patients easily accounts for the decrease of the fever; patient No. 7 was 67 years old, and No. 16 was 63 years of age.

We consider that we are now authorized to say that, in yellow fever we are able, in the majority of serious cases, to detect, from the beginning of the fever, one of its most precious *diagnostic signs*, and that is the *divergence* of the lines indicating the march of temperature and pulse. The line of the pulse *descends immediately*, whilst the line of temperature *ascends*, and that during one, two, and even three days.

At the end of the paroxysm, the opposite obtains in the majority of cases that prove fatal—7 in 12 (obs. Nos. 2, 7, 11, 12, 15, 27, 32) the pulse increased to a high ratio, became imperceptible and the temperature went down several degrees. In cases of recovery, at the end of the paroxysm both lines are parallel with each other on the decrease, and go on that way even below the normal point.

In the paroxysmal stage, the *concomitant* march of both lines (temperature and pulse) is of some import as concerns the prognosis; if the lines stop descending, and especially if they ascend together, we must look out for the cause of this augmentation of the fever. Is it an external cause? So much the better then, (obs. No. 8—a phlegmon; obs. No. 21—parotitis). If the cause of the augmentation of the fever is internal (capillary congestion of some organ), we are made aware of danger. If, in their descent, the lines, in the middle of their course, begin diverging, that of the pulse ascending whilst the line of temperature descends, the danger then is very great.

But I shall insist upon saying that the direction of the lines of temperature and pulse is of especial importance in the *incipient* stage of the febrile paroxysm of yellow fever, in view of the diagnosis of the disease. In the great majority of serious cases, *the line of the pulse descends, whilst the line of temperature ascends*. Are we not justifiable in our belief that there very likely exists no other disease in which the same occurrence obtains? Of course we can not be positive in so saying, without ascertaining the condition of the pulse in all fevers, as well as yellow fever. In the incipient febrile stage of variola, we have the same *ascending direction of the line of temperature*, even for four days: the probability is that in the meantime the direction of the line of the pulse *is not descending*. It would be more satisfactory if we could affirm what we suggest.

We do not pretend to establish, with the assistance of some thirty observations, a fact of such import; we merely mean, with Drs. Tonatre and Layton, to call the attention of investigators to further inquiry.

Let us now consider the *specific character* of yellow fever, which shows itself, in our opinion, by the *action* of its morbid principle on the *heart*, this action being denoted by a diminution in the number of pulsations, from the very beginning; we have more facts to establish this second point than we had concerning the first.

The impossibility of reproducing our 38 *tableaux of lines* has induced us to select some of our most characteristic observations, and write them down in shape of *tableaux of numbers*, for the "N. O. MEDICAL AND SURGICAL JOURNAL."

TABLE I.—Mild Cases.

DR. FAGET—Obs. No. 19. <i>Boy 3 Years Old.</i>			DR. TOUATRE—Obs. No. 13. <i>Young Woman.</i>			DR. FAGET—Obs. No. 17. <i>Young Woman, pregnant in the Fourth Month</i>		
	Temp. Morning.	Pulse, Morning.		Temp. Morning.	Pulse, Morning.		Temp. Morning.	Pulse, Morning.
1st day	103° 1' F.	116	1st day	103° 3' F.	118	1st day	102° 2' F.	130
2d day	101 5	110	2d day	10 7	96	2d day	103 2	118
3d day	99	76	3d day	100 8	80	3d day	101 2	104
4th day	99	68	4th day	99 5	76	4th day	99 5	84
5th day	99	68	5th day	99 5	72	5th day	98 6	84
6th day	/	/	6th day	/	/	6th day	98 2	70

TABLE II.—Serious Cases.

DR. FAGET—Obs. No. 31. <i>Frenchman, aged 23 Years.</i>				DR. LAYTON—Obs. No. 3. <i>Frenchman, 27 Years Old.</i>			
	Temperature. Morn'g. Even'g.		Pulse. Morn'g. Even'g.		Temperature. Morn'g. Even'g.		Pulse. Morn'g. Even'g.
1st day			108	1st day			
2d day	101° 1' F	102° 2' F	100	2d day	104° F	105° 4' F	104 96
3d day	102 6	103 7	96	3d day	105	105 8	88 84
4th day	101 5	102 2	88	4th day	104 4'	104 4	80 76
5th day	99 5		80	5th day	103	103 3	62
6th day	99 6	100 4	80	6th day	101 5	101 9	60
7th day	98 6		70	7th day	100 4	99 7	60 58
8th day	96 8		58	8th day	99 6	99 6	52 52
9th day	96 8		48	9th day	99 6	99 6	52 48
10th day	96 3		45	10th day	100	100 4	42 58
		/	/	11th day	100 4	100 4	64 64
				12th day	100	99 6	56 64
				13th day	100	100 4	58 48
				14th day	100 4	100 6	64 66

DR. TOUATRE—Obs. No. 14. <i>Frenchman, 25 Years Old.</i>			
	Temperature. Morn'g. Even'g.		Pulse. Morn'g. Even'g.
1st day		102° 2' F	130
2d day	103° F.	104	112
3d day	103	104 5	100
4th day	101 2'	102	84
5th day	99 5		80

TABLE III.--Fatal Cases.

DR. TOUATRE—Obs. No. 2.				DR. TOUATRE—Obs. No. 12.				DR. FACET—Obs. No. 11.			
<i>A Frenchman.</i>				<i>A Frenchman.</i>				<i>A Sicilian.</i>			
Temperature.		Pulse.		Temperature.		Pulse.		Temperature.		Pulse.	
Morn'g.	Even'g.	Morn'g.	Even'g.	Morn'g.	Even'g.	Morn'g.	Even'g.	Morn'g.	Even'g.	Morn'g.	Even'g.
1st day	...	103° 6' F.	100	1st day	...	103° 7' F.	110	1st day	...	105° 8' F.	84
2d day	103° 2' F	104 4	100	2d day	103 8	104° 6' F.	104	2d day	...	106° F.	108
3d day	102 6	...	80	3d day	103 7	104 2	89	3d day	109	96	...
4th day	103 1	103 4	86	4th day	103 7	103 1	64	4th day	...	...	...
5th day	1 2 2	102 2	88	5th day	101	101 3	82	5th day	...	...	...
6th day	100 4	...	88	6th day	104 4	101 5	84	...	...	...	...
7th day	102	102 2	88	7th day	99 7	101 2	103	...	...	...	...
8th day	102 2	...	110	8th day	101 3	100 2	100	...	...	...	...
9th day	102 2	...	...	9th day	99 2	99 5	100	...	...	...	...
10th day	98 6	...	...	10th day	99 5	...	100	...	...	...	...
11th day	...	...	...	11th day	99	...	130	...	...	...	...

VI.

SPECIFIC CHARACTER OF YELLOW FEVER.

In the work that I published on yellow fever in 1859, after having studied the progress of this fever without the thermometer, guided only by statistics of the pulse, and these statistics compiled from at least a hundred observations, taken by a dozen physicians during the epidemics of 1839, 1853, 1858; I expressed myself in the following manner (p. 85):

“In all these observations written at the bed-side of the patients, during three different epidemics in New Orleans, we perceive, nearly without exception, that the pulse, at its *apogee* from the first day gives me more than 100, sometimes 110 and 120 pulsations; begins to fall the second day, continues to decrease regularly the third, and gives, from that time, 70 to 80 (sometimes much less).”

Then, in this immediate decrease in the rapidity of the pulse, I could already see the characteristic or specific trait of yellow fever; for on the preceding page (84) I had just said: “The regular and rapid decrease of the pulse is such in yellow fever, from a record of a hundred observations, that we could recognize it as the true characteristic of that fever.”

To-day, after the epidemic of 1870, that is to say, after having been able to study the progress of yellow fever, not only with the “independent second watch,” but at the same time with the thermometer, I think further hesitation is impossible; the diminished frequency of the pulsations, that is to say, the heart’s action, show themselves from the beginning in yellow fever, and consequently in the height of febrile excitement as certified by the thermometer. This is the essential characteristic of this fever; and, in fact, a like decline of the pulse is not a simple abatement of the fever, since it occurs at the height of febrile excitement, and even in the great majority of cases during the increase of temperature. We find, then, a diminution of the beats of the heart, produced by a direct specific action of the poison itself of yellow fever, on the central organ of circulation. This specific action of yellow fever poison on the heart can be compared to the effect produced on that organ by certain poisons, as, for instance, digitalis and veratrum viridi.

But if there are natural poisons that possess the property of diminishing the heart’s action, does there exist a fever exciting

cause, besides that of yellow fever, that will produce this double effect?

1st. Of lighting up fever in the organism.

2d. While the high temperature is maintained, of lessening the pulse as if the patient had taken veratrum?

We do not think so; for us, so far, yellow fever has alone presented this peculiarity.

The effect of yellow fever poison on the heart is carried to such an extent, and lasts so long that we have seen several times, about the tenth day, the pulse fall to about 40, and Blair has seen it fall to about 24 (p. 75).

Now, if yellow fever is the only fever in which the essential principle, that is to say the specific poison, produces such effects (as the small-pox poison produces, only small-pox pustules,) it becomes incontestible that it is essentially and necessarily a specific fever—a true febrile type, as well as variola. And we wish here to remark that we confine ourselves entirely to the definition given to the word (type) by Sydenham.

Thus it was that he expressed himself in paragraph 171, in his work on Pestilential Fevers in 1665 and 1666.

(Unaquaeque morborum, non minus quam animalium aut vegetabilium, species, affectiones sibi proprias, perpetuas, ac pariter univocas, ab essentiâ suâ promanentes, sortita est.)

From which it results that to admit the existence of a morbid type, it must possess its peculiar and constant signs due to the morbid principle itself. The peculiar distinguishing sign of the yellow fever type is the effect produced on the heart by the febrile principle. This poison directly weakens the action of the heart, in diminishing its beats, while the febrile exacerbation it has lit up in the blood is at its height. But it will be said that a hundred observations are but few on which to establish such a fact. But here, by singular good fortune, we have found on page 75 of Blair's observations already cited, a table of statistics showing the average of the pulse, confirmatory of ours, and taken from more than 400 personal observations.

This table of Blair's was published in 1852. It results, therefore, that the average decrease of the pulse from the first day, in yellow fever, has appeared in science before, in a practical demonstration of the fact. In truth, Blair has contented himself by giving his statistical table, and did not call attention to the fact that resulted from it. This fact strikes one's attention, however, in this table.

Nombre des Obser- vations.	Jour de Maladie.	Moyennes du Pouls.	Difference.
121	1 ^r jour	97.40	
338	2 "	90.80	7
406	3 "	83.53	7
388	4 "	80.44	3
311	5 "	78.56	2
206	6 "	78.74	2
125	7 "	78.78	2
71	8 "	75.62	
46	9 "	75.76	
29	10 "	77.58	
16	11 "	76.37	
7	12 "	76.00	
5	13 "	79.20	

How can we not see that on an average in Guiana, yellow fever presented on the second day 7 pulsations less than on the first; and on the eighth, 7 less than the second; the fourth day 3 less than on the third; and the following days the decline became less and less rapid, but still continued. Of the four epidemics in New Orleans in which I recorded the pulse, I compiled average tables on Blair's model; then from these four tables I compiled a general table which gives averages drawn from the averages of the four different epidemics. It will suffice to reproduce here this last general table of statistics.

Table of the Average of the Pulse, Taken from the Average of four different Epidemics in New Orleans.

Number of Obser- vations.	Day of Fever.	Average of Pulse.	Difference.
73	1st day	113.7	
82	2 "	100.7	13
86	3 "	90.	10
95	4 "	84.	6
69	5 "	76.	8
47	6 "	71.7	5
26	7 "	67.7	4

In this table of general averages we notice a diminution of 13 pulsations from the first to the second day, from the second to the third a diminution of 10, and in the succeeding days, though the diminution is less great, it is still plainly perceptible up to, and beyond the seventh.

Now, if we compare the statistics of Georgetown (Guiana), and

those of New Orleans, we find of course a difference, probably due to the climates, but the general diminution in the frequency of the pulse during the first days of yellow fever cases was the same in both countries. Now, these tables were compiled from over 500 special observations, more than 100 in New Orleans, and more than 400 in Georgetown. A general clinical fact such as this, (the progress of the pulse in fever) based on upwards of 500 special observations seems to us to be definitively established. We think, then, we are able to conclude that in yellow fever the pulsations of the heart, as well as the temperature, have their maximum at the beginning of the disease, and decrease thenceforward. That the number of pulsations diminishes hourly, and that during convalescence we have sometimes seen them descend to nearly half their normal frequency.

This is in our opinion the specific characteristic of yellow fever, no other fever presenting anything similar.

Now, the specific character, *clinically demonstrated*, has just received the most remarkable *anatomical confirmation* in the observations upon yellow fever (just published by Prof. Joseph Jones, of the University of Louisiana). This is what he says on page 8 of his pamphlet:

"The central organ of circulation is structurally altered and enfeebled in yellow fever, the muscular structures of the heart present alterations similar to those observed in the liver and kidneys. Oil, granular, albuminoid, or fibroid matter is deposited within and around the muscular fibrillæ, and the organ after death presents a yellow, flabby appearance: (for Dr. J. Jones) these lesions of the heart, shown by careful post-mortem examination, are characteristic of the disease."

In completing this third portion of our work we should call attention to the fact that the general table of the average of the pulse, furnished by Blair, like ours of New Orleans, not only shows the steadily decreasing character of the pulse in yellow fever, but it also demonstrates beyond a doubt that this fever has but one paroxysm, and consequently it is a continued fever, continually decreasing, but still continued.

And this statement possesses more weight from the fact that the general table compiled in Georgetown, was made from special observations collected in a locality equally as marshy as ours.

If, then, yellow fever remained a fever with but one paroxysm, in Guiana as well as in New Orleans, it proves it not only to be a

continued fever, but one that resists efficaciously the concomitant influences of malarial fever.

VII.

RESUME AND CONCLUSION.

1st. During the small epidemic of yellow fever of 1870, in New Orleans, several physicians have had an opportunity to study the *march* of the *unique paroxysm* which constitutes this fever, not only with the assistance of the independent second-hand watch, but also with the thermometer. The first result furnished by such observations, regardless of course of the slight evening exacerbations to be met with in all fevers, is that: during that *single paroxysm* of yellow fever, the *fever* has shown a *continuous* type. The *maximum point* of this single febrile stage, as regards both the pulse and temperature, has been *very rapidly reached*; then, the fever began *decreasing immediately*, without giving any signs of a stationary stage, and has often gone down below the normal condition.

2d. During the *first days*, however, the two instruments have *disagreed*, at least in two thirds of the cases: the *maximum* of the *fever* was reached as early as the first hours of the disease, as in fevers with several paroxysms; then immediately the number of pulsations would *diminish*, whilst the temperature continued *increasing* for two or three days, the increase being very small from the first to the second day, and still smaller from the second to the third day.

This second result is worth the consideration of all observers; for, if it proves true on a large scale, and, if we are fully satisfied that yellow fever is the *only fever* in which, in the first stage, the pulse is thus seen to *descend* immediately after reaching its *maximum point*, whilst the temperature goes on *increasing*, for two or three days; the inevitable consequence is that in the great majority of cases, we shall be able with the assistance of the *independent second-marking watch* and the *thermometer*, to give a *correct diagnosis in the very first hours* of the disease.

3d. As for the *decrease of the pulse*, or the decrease in the *beatings of the heart*, from the beginning, taking into consideration all the observations made, even before the thermometer was brought into use, it is, in our opinion, a *general fact* based upon the analysis of more than 500 *particular facts*; we consider it as

definitely established, and we take it to be the *specific clinical characteristic* of the disease.

4th. This *general fact* based upon the average of observations made in Guiana and in Louisiana, that is to say in the midst of the most powerful malarial or swampy influences, goes to prove the two following points:

(1st.) Yellow fever has nothing to do with the *paroxysmal* fevers of all types; (2d.) it even resists remarkably the influence of *malarial poisons*, and preserving, amidst their emanations, its *type* as a fever with only one *paroxysm*, continuous and decreasing.

5th. The main conclusion of our article, published in the *N. O. Journal*, July, 1870, is thus fully confirmed by the new facts herein added: After quoting the following from La Roche, of Philadelphia, page 437, vol. i., "That the two diseases (yellow fever and malarial fever) may prevail at the same time, in the same place, and also *co-exist* in the system, are facts too evident to be denied." I went on saying that, "When the two morbid agents come simultaneously in action, it is only after the *continued decreasing* fever will have ended that the fever with *paroxysms* will develop itself; *a fortiori* will it yet be so when the yellow fever agent will have had the start; finally, when it is the paludal poison which has first entered in action, this action is suspended as soon as the yellow fever poison enters in fermentation, in such a manner that the intermittent progress of febrile action *immediately substituted* by the *continued march*."

CONSEQUENTLY, an *intermittent fever* which remains intermittent until the end, whatever may be the symptoms * * * * *black vomit* or not * * * cannot be *yellow fever*; it is a pure paludal fever, even during the prevalence of an epidemic of yellow fever."

Then I gave in the same article, as confirmative facts, some ten observations, retaining as many more intended for the next number of the paper. These were observations of *paroxysmal* fevers of all types, from the genuine intermittent down to the *pseudo-continuous*, bearing the greatest resemblance with the continuous; in all these cases black vomit had shown itself, and sulphate of quinine had proved remarkably beneficial and successful. I had made a selection of such cases only as had been examined by several confreres called in consultation. There can be no question about such cases.

Last Conclusion—It thus appears to me that the existence of the

hematemetic form of the "*malarial hemorrhagic fever*," is based upon the most solid foundations, facts and reasoning.

Can the objection be made that we are creating a *new* fever? Our answer stands in the heading of this article: "*Nil sub sole novum.*"

In the time of Hippocrates, the hemorrhagic malarial fevers had been observed in the Islands of Greece; the vomiting of *atrabile* was what we call black vomit; hematuria was not unfrequent. But, was it known, in those days, that *black* or dark urine and *atrabile* contained blood as the coloring agent—were signs of *hemorrhagic fevers*? Of course not.

I was reading some time ago in the "*Medicine Through the Centuries*," by Guardia, a quotation from the works of Piquier, a physician of the King of Spain, (Charles, VI.) in which Piquier speaks of *black vomit* showing itself in the central part of Spain, during the paroxysms of the *tertian* fevers, and he does not show the slightest surprise:

"In 1758, says Piquier, the court moved as usual to Aranjuez, during the better part of the year. The King remained there until the 27th day of August, when the queen died; she had been ill since the 20th day of July. Aranjuez is an unhealthy place in summer and in fall; that particular year we had a great many cases of *tercer* fevers, *epidemic*; the most robust people were not exempt from the attacks. Sometimes the paroxysms *were accompanied with black vomit*, and showed as a rule a malignant character." Guardia, p. 270.

Did Piquier take these *tertian fevers* with *black vomit* to form part of the great class of the *hemorrhagic malarial fevers*? Did he feel the necessity to consider them as a special form, the *hematemetic* form of the *hemorrhagic malarial fever*? Of course not; he *could* not.

One hundred years later, and, especially as far as we, physicians of New Orleans, are concerned, it is necessary to make these *classifications* and distinctions.

Chemistry and the microscope have largely contributed to the study of the *hemorrhagic malarial fever*; its *hematuric* form is definitely admitted; the *hematemetic* form must also be accepted.

Is it necessary that we should insist on the importance of not mistaking *yellow fever* for the malarial or *paludal hematemetic fever*? The treatment of yellow fever is yet exposed to the influence

of theories and experimentation; that of paludal hæmatemesic fever has a *specific* remedy, which is quinine!

I agree in consequence, and fully agree, with Professor Bemiss, when he says in the late number of the NEW ORLEANS MEDICAL AND SURGICAL JOURNAL, that: "We are surely wise when we endeavor to acquaint ourselves with the nature, symptoms and treatment of yellow fever. * * * * But let us never lose sight of the fact that, in the 'Mississippi Valley,' and in the whole 'Cotton Belt,' the swamp poison is, by far, man's most destructive foe."

Therefore, as far as concerns the physician practising in New Orleans, or in any other part of the South of the United States, the study of yellow fever must only be considered as a sort of an introduction to a much more important study to him, that of the malarial hemorrhagic fever, *in all its varieties* even, and further more, especially in its *hamatemesic variety*.

